

# Z-Glyph: Visualizing outliers in multivariate data

## 发表

---

Information Visualization 2017

Nan Cao <sup>1,\*</sup>, Yu-Ru Lin <sup>2,\*</sup>, David Gotz <sup>3,\*</sup> and Fan Du

## 摘要

---

multivariate data

## 挑战

---

1. defining “normal” (and “anomalous”) behavior 定义异常，正常的行为
2. 高质量的标记数据难以获得

## 贡献

---

1. Extending the existing design. (Z-Star Glyph的拓展)  
利用了
  - human perception features
  - visual metaphor 隐喻
  - statistical characterization
2. Extensive controlled experiment.
3. Case studies on real datasets.

## 相关工作

---

1. outlier detection
2. glyph-based visualization
3. similar visual designs

## 评估

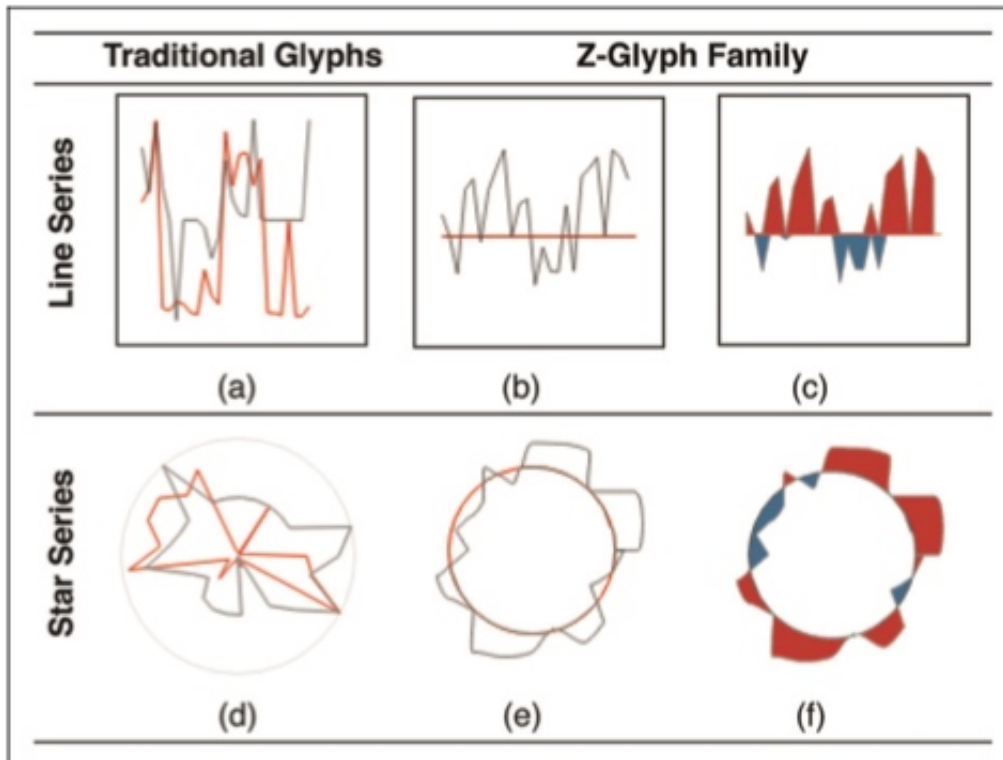
---

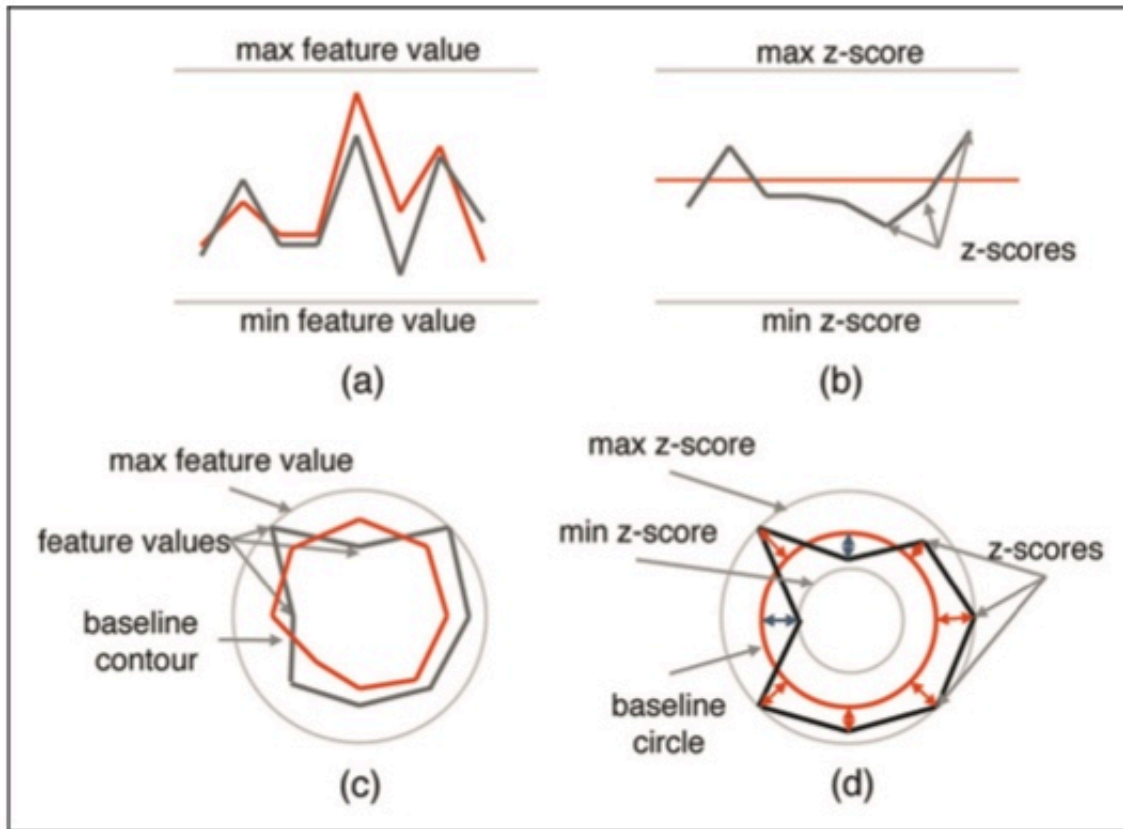
1. Case studies
2. experts interview

## 设计

问题： how to represent outlier information that can be easily perceived and recognized by human

- Choosing optimal visual channels.
- Utilizing visual metaphor
- Incorporating statistical distribution concept.





## 数据集

1. chronic kidney disease (CKD).
2. 500 Twitter accounts,

## 讨论

1. When should Z-Glyphs be used?
  - outlier detection tasks for all types of multivariate data in which
    - the data are normal deviate or
    - the data can be transformed to be close to the location-scale distributions.
2. the Star glyph family popular
3. Z-Line(D) outperform Z-Star(D) **D是加了颜色**
4. colors provide little help?

Z-Glyph 更适合特征符合正态分布的数据

## 结论

the first set of glyphs that were designed for revealing outliers in a multivariate dataset.